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Document: # Unnumbered ; Date 1/30/85 ;

Title/Subject Ltr, LW Long to ME Mitchell, "Uranium Accountability of the ORGDP" & enclosures

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K-25 Classification & Information Control Officer — Date 1/15/93

January 30, 1985

M. E. Mitchell

Uranium Accountability of the Oak Ridge Gaseous Diffusion Plant (ORGDP)

On December 31, 1984, Vincent Fayne contacted the Environmental Management Department and requested information on the discharge, release, or disposal of uranium since the start-up of the ORGDP. This information is to be provided to Mr. Frank Munger of the Knoxville News-Sentinel. As a result of this request, we have reviewed the available uranium accountability and environmental records.

The enclosed tables represent a compilation of the ORGDP records from 1946 through 1983. Prior to 1946, no records existed on uranium disposition. Prior to 1972, environmental records are extremely limited and cannot be verified. Therefore, in the 1946-1972 time frame, uranium accountability records have been utilized as the sole source of information. Records during this time frame are incomplete and provide little insight on the final disposition of uranium waste. Many assumptions had to be made in order to compile this data. The following is a brief discussion of these assumptions.

Airborne Uranium Releases

1. Prior to 1964, average uranium assay is assumed to be 20 percent.
2. After 1964, enriched uranium is assumed to be 1.0 percent unless specified from the K-27 area, then it is assumed to be 3.2 percent.
3. When records were incomplete and the material was UF_6, it is assumed to be an airborne release.
4. Many assumptions were made on assay based on location and/or experience.
5. Prior to 1972, uranium accountability records have been used solely.
6. After 1972, the table reflects a compilation of both uranium accountability and environmental records.

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Liquid Effluent Discharges

1. Prior to 1964, enriched uranium is assumed to be 20 percent.

2. After 1964, enriched uranium is assumed to be 1.0 percent.

3. All records indicating that the material was a solution, a laboratory waste, or a develop waste are assumed to be a liquid waste unless otherwise specified.

4. Many assumptions were made on assay based on location and/or experience.

5. Prior to 1972, uranium accountability records have been used solely.

6. After 1972, the table reflects only environmental data. Extensive environmental analytical data exist from 1972.

Solid Waste

1. Prior to 1964, enriched uranium is assumed to be 20 percent.

2. After 1964, enriched uranium is assumed to be 1.0 percent.

3. Solid waste compilations are based on both uranium accountability and environmental records.

4. Many assumptions were made on assay based on location and/or experience.

5. Prior to 1972, uranium accountability records have been used solely.

6. Solid waste data includes both burial records and uranium bearing sludges.

7. During 1973, the K-1407-B pond was dredged and the uranium bearing sludge was placed in the K-1407-C pond. Since this material had remained onsite and had not been discharged in the liquid effluents, this quantity was proportioned, based on the liquid discharge records and then subtracted from the liquid effluent data. Quantities of uranium in this sludge was then proportioned from 1946 through 1973 and included as solid waste.

8. Data from 1974 through 1983, includes both burial records and environmental estimates on the quantity the uranium deposited in the ORGDP holding ponds.

9. It should be noted that the burial records do not specifically indicate where this material was buried. Therefore, much of this material may be counted twice if the Y-12 facility also inventories this material.

It is extremely difficult to evaluate this data and to make evaluations as to why quantities were released at given times. Certainly a lack of environmental controls and the dedication to national objectives contributed.

Two dates are of note when reviewing this data. Prior to 1964, the mission of the ORGDP was primarily the enrichment of uranium for weapon programs. In 1964, the emphasis shifted to supplying enriched uranium for nuclear power plants. Along with this change of emphasis, the ORGDP ceased to produce high-assay uranium, and only approximately three percent assay uranium has been produced since that time. From 1950 until 1968, the ORGDP K-1131 feed plant operated converting UO_2 to UF_6. Although records are incomplete, this facility is believed to be the source of many releases.

It is our understanding, that this information will be forwarded to DOE and subsequently to Mr. Frank Munger of the Knoxville News-Sentinel.

If you have further questions concerning this compilation, please contact us.

L. W. Long, K-303-7, MS 338, ORGDP (4-8222)

LWL:rcd

Enclosures

cc: W. R. Golliher
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Table

DOE-ORGDP Airborne Uranium Emissions

1946 - 1983

YEAR	KILOGRAMS	CURIES
1946	1	1.3×10^{-2}
1947	<1	3.0×10^{-3}
1948	5	3.7×10^{-3}
1949	45	1.6×10^{-3}
1950	136	9.2×10^{-2}
1951	146	2.3×10^{-2}
1952	345	2.3×10^{-1}
1953	1,307	1.6×10^{0}
1954	68	2.6×10^{-1}
1955	264	2.6×10^{-1}
1956	225	8.1×10^{-1}
1957	306	1.5×10^{-1}
1958	2,711	1.8×10^{0}
1959	531	1.1×10^{0}
1960	977	1.5×10^{0}
1961	773	3.1×10^{0}
1962	29	2.4×10^{-1}
1963	1,005	3.1×10^{0}
1964	7	1.0×10^{-2}
1965	269	1.4×10^{-1}
1966	1	8.1×10^{-4}
1967	2	1.6×10^{-3}
1968	<1	4.8×10^{-4}
1969	9	6.1×10^{-3}
1970	8	6.9×10^{-3}
1971	21	1.7×10^{-2}
1972	49	3.2×10^{-2}
1973	144	1.3×10^{-1}
1974	622	4.4×10^{-1}

Table

DOE-ORGDP Airborne Uranium Emissions

1946 - 1983

YEAR	KILOGRAMS	CURIES
1975	371	2.7×10^{-1}
1976	45	5.0×10^{-2}
1977	17	2.6×10^{-2}
1978	19	1.8×10^{-2}
1979	25	3.8×10^{-2}
1980	21	2.6×10^{-2}
1981	5	6.8×10^{-3}
1982	2	2.0×10^{-3}
1983	2	2.1×10^{-3}
TOTAL	10,515	15.5×10^{0}

Table

DOE-ORGDP Liquid Effluent Uranium Releases

1946 - 1983

YEAR	KILOGRAMS	CURIES
1946	<1	1.4×10^{-3}
1947	—	—
1948	4	2.7×10^{-2}
1949	3	2.4×10^{-3}
1950	—	—
1951	80	5.3×10^{-2}
1952	4	2.6×10^{-3}
1953	26	1.0×10^{-1}
1954	84	2.3×10^{-1}
1955	16	5.1×10^{-2}
1956	90	2.4×10^{-1}
1957	40	1.8×10^{-1}
1958	<1	3.2×10^{-3}
1959	5	2.2×10^{-3}
1960	<1	8.3×10^{-3}
1961	2	1.9×10^{-2}
1962	2	1.3×10^{-2}
1963	1,576	5.1×10^{0}
1964	1,826	1.1×10^{0}
1965	33	1.4×10^{-2}
1966	21	9.0×10^{-3}
1967	12	4.2×10^{-3}
1968	330	2.6×10^{-1}
1969	3,180	1.2×10^{0}
1970	88	5.6×10^{-2}
1971	76	4.4×10^{-2}
1972	1,601	8.6×10^{-1}
1973	570	4.4×10^{-1}
1974	508	4.0×10^{-1}

Table

DOE-ORGDP Liquid Effluent Uranium Releases

1946 - 1983

YEAR	KILOGRAMS	CURIES
1975	564	4.4×10^{-1}
1976	306	2.4×10^{-1}
1977	2,201	1.7×10^{0}
1978	688	5.4×10^{-1}
1979	537	4.2×10^{-1}
1980	803	6.3×10^{-1}
1981	601	4.7×10^{-1}
1982	114	8.9×10^{-2}
1983	233	1.8×10^{-1}
TOTAL	16,277	15.1×10^{0}

Table

DOE-ORGDP Solid Uranium Waste

1946 - 1983

YEAR	KILOGRAMS	CURIES
1946	—	—
1947	—	—
1948	—	—
1949	—	—
1950	—	—
1951	—	—
1952	—	—
1953	—	—
1954	—	—
1955	—	—
1956	—	—
1957	—	—
1958	1,788	1.2×10^{0}
1959	—	—
1960	—	—
1961	—	—
1962	—	—
1963	1,700	5.5×10^{0}
1964	1,989	1.1×10^{0}
1965	1	5.3×10^{-4}
1966	1,928	9.9×10^{-1}
1967	—	—
1968	595	3.7×10^{-1}
1969	4,784	1.8×10^{0}
1970	1,319	8.7×10^{-1}
1971	131	8.4×10^{-2}
1972	27,491	10.7×10^{0}
1973	2,458	1.8×10^{0}
1974	710	5.5×10^{-1}

Table

DOE-ORGDP Solid Uranium Waste

1946 - 1983

YEAR	KILOGRAMS	CURIES
1975	761	5.9×10^{-1}
1976	1,345	9.5×10^{-1}
1977	3,179	2.5×10^{0}
1978	1,090	8.5×10^{-1}
1979	1,555	1.2×10^{0}
1980	1,863	1.2×10^{0}
1981	1,059	8.3×10^{-1}
1982	546	4.3×10^{-1}
1983	287	1.8×10^{-1}
TOTAL	56,579	33.7×10^{0}